

## **CRUISE REPORT**

Southeast Fishery-Independent Survey (SEFIS)

R/V *Savannah* Cruise SH-11-21  
18 – 29 July, 2011  
Total Number of Sea Days - 12

U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southeast Fisheries Science Center  
Beaufort Laboratory  
101 Pivers Island Rd.  
Beaufort, NC 28516

128 camera-trap deployments  
2 hook and line deployments  
22 CTD casts

## INTRODUCTION

The R/V *Savannah* departed Savannah, GA, on 18 July 2011 with scientists from the Southeast Fishery-Independent Survey (SEFIS) to sample in continental shelf and shelf-break waters off the southeastern US. SEFIS was created by the National Marine Fisheries Service in 2010 and is run out of the Beaufort Laboratory. This survey conducts applied fishery-independent sampling and related research focusing on the assessment of spatial variability in distribution and abundance of red snapper and other reef species within the snapper-grouper complex, via data collected from fish traps, video cameras, and acoustics. During this survey, chevron trap catches and associated underwater video recordings were collected from randomly selected stations on known hardbottom habitats between 27.76 N and 31.51 N. A total of 128 stations were sampled with camera-trap gear over 12 sea days between 20 and 94 meter depths.

## OBJECTIVES

1. Increase the spatial footprint and sample size of fishery-independent sampling in US southeast waters. Baited chevron traps, most of which had one or more mounted high-definition video cameras, were utilized for hardbottom reef fish community assessments and collection of reef fish for biological samples (i.e., otoliths and gonads).
2. Use video cameras on chevron traps to address trap selectivity issues, locate and describe hardbottom habitats, and provide an additional index of abundance for stock assessments.
3. Use a CTD instrument package to collect environmental data (temperature, salinity, dissolved oxygen, and turbidity) at camera-trap sampling locations.

## METHODS

### Camera-Trap Sampling

Camera-trap gear consisted of two high definition video cameras mounted to a chevron fish trap. Chevron traps were constructed out of plastic-coated wire mesh. A Canon camera (model HF S200) was attached above the mouth of the trap, and a GoPro camera (model HD Hero) was attached above the nose of the trap (Figure 1). Traps were baited with Atlantic menhaden, *Brevoortia tyrannus*, and video cameras were set to record before deployment. Camera-traps were deployed at randomly selected stations at least 200 meters apart on suspected or known hardbottom habitats, and left to soak for approximately 90 minutes. Camera-traps were most often deployed in sets of six. A CTD cast (see environmental data collection) was conducted during the 90-minute soak time for each trap set. Fish catches were processed after trap retrieval. All fish were counted, weighed, and measured to the nearest millimeter. Individuals of select species (e.g., species in the snapper-grouper complex) were further processed for additional lengths and biological samples (otoliths, gonads, and DNA). Video files were downloaded and backed up on media storage devices. Biological samples and video files were brought to the laboratory for further processing and analysis.

### **Hook and Line Sampling**

Hook and line fishing was conducted to gather stomach samples for analysis and to supplement age/growth samples. A variety of reel, line, and hook sizes were used, typically with 3 hooks baited with a mixture of cut squid and cigar minnow. Targeted species for stomach content analysis were vermilion snapper, gray triggerfish, and red porgy. Fish collected with hook and line gear were counted, weighed, measured, and processed for biological samples (gonads, otoliths, and stomachs). Each successful fishing event (all anglers grouped together) was assigned a collection number.

### **Environmental Data Collection**

Environmental data were collected with a Seabird “Conductivity, Temperature and Depth” instrument package (CTD; model SBE 25) and Scientific Computer System software (SCS). CTD casts were conducted near the middle of each camera-trap soak period; instruments were lowered to within 2 meters of the bottom. Numerous water profile measurements were collected, including temperature (°C), salinity (parts per thousand), dissolved oxygen (mg/L), and turbidity (% transmission). CTD data were archived for further processing at the Beaufort laboratory. SCS software (version 4.2.3) was used to collect specific information for each fishing and CTD event, including soak time/cast duration as well as start and end latitude, longitude, and depth (m).

## **SURVEY RESULTS**

### **Camera-Trap and Hook and Line Sampling**

128 stations were sampled with camera-trap gear (Table 1, Figure 2). From these traps, 25 taxa were collected and worked up for length frequency data.

### **Hook and Line Sampling**

2 additional stations were sampled with hook and line gear. From these collections, 2 taxa were worked up for length frequency data and further processed for otoliths, gonads, and stomach tissues.

### **Environmental Data Collection**

22 CTD casts were conducted during the cruise (Table 1, Figure 2). CTD data will be processed back at the lab using Seabird SBE Data Processing software (version 7.2), and archived in a database at the NMFS–Beaufort Laboratory for future analysis.

Table 1. Summary of station coordinates, depth, date and time for each fishing event (camera-trap Gear=324, hook and line Gear = 014) and CTD cast (Gear=298) conducted on the SH-11-21 survey. Values highlighted in yellow are estimated. Times were recorded in Coordinated Universal Time (UTC).

Collection Number	Gear	Date	Time (UTC)	Latitude	Longitude	Depth (m)
113247	324	07/19/2011	11:51:32	29.95	-80.48	42
113248	324	07/19/2011	12:01:15	29.95	-80.50	43
113249	324	07/19/2011	12:11:59	29.94	-80.49	43
113250	324	07/19/2011	12:27:22	29.93	-80.50	40
113251	324	07/19/2011	12:36:39	29.93	-80.52	37
113252	298	07/19/2011	13:16:27	29.94	-80.49	43
113253	324	07/19/2011	15:37:49	29.86	-80.54	38
113254	324	07/19/2011	15:44:56	29.86	-80.54	39
113255	324	07/19/2011	15:55:17	29.86	-80.53	37
113256	324	07/19/2011	16:05:50	29.85	-80.53	38
113257	324	07/19/2011	16:15:59	29.85	-80.53	37
113258	298	07/19/2011	16:26:52	29.85	-80.52	38
113259	324	07/19/2011	19:25:48	29.77	-80.45	34
113260	324	07/19/2011	19:37:53	29.76	-80.45	36
113261	324	07/19/2011	19:48:20	29.76	-80.45	34
113262	324	07/19/2011	19:57:24	29.75	-80.45	34
113263	298	07/19/2011	20:12:36	29.77	-80.44	39
113264	324	07/20/2011	12:50:34	27.76	-80.02	53
113265	324	07/20/2011	17:39:10	28.09	-80.21	29
113266	324	07/20/2011	17:43:11	28.09	-80.21	28
113267	324	07/20/2011	17:49:38	28.09	-80.21	33
113268	324	07/20/2011	17:55:42	28.09	-80.21	28
113269	324	07/20/2011	18:02:44	28.08	-80.21	29
113270	324	07/20/2011	18:06:24	28.08	-80.20	29
113271	298	07/20/2011	18:22:56	28.09	-80.19	32
113272	298	07/20/2011	20:47:55	28.14	-80.22	26
113273	324	07/21/2011	21:14:30	28.15	-80.22	27
113274	324	07/21/2011	21:21:04	28.15	-80.22	25
113275	324	07/21/2011	21:31:18	28.16	-80.23	27
113276	324	07/21/2011	12:00:16	28.60	-80.12	55
113277	324	07/21/2011	12:05:47	28.60	-80.13	53
113278	324	07/21/2011	12:17:08	28.60	-80.12	57
113279	324	07/21/2011	12:24:22	28.60	-80.12	55
113280	324	07/21/2011	12:30:35	28.59	-80.12	56
113281	324	07/21/2011	12:39:48	28.59	-80.12	55
113282	298	07/21/2011	12:49:37	28.60	-80.12	56

Collection Number	Gear	Date	Time (UTC)	Latitude	Longitude	Depth (m)
113283	324	07/21/2011	19:16:10	28.84	-80.44	20
113284	324	07/21/2011	19:25:38	28.84	-80.44	21
113285	324	07/21/2011	19:28:26	28.83	-80.44	21
113286	324	07/21/2011	19:31:28	28.83	-80.44	22
113287	324	07/21/2011	19:46:35	28.82	-80.44	20
113288	324	07/21/2011	19:58:38	28.81	-80.44	20
113289	298	07/21/2011	20:39:19	28.85	-80.43	23
113290	324	07/22/2011	11:54:12	29.17	-80.31	43
113291	324	07/22/2011	11:57:30	29.18	-80.31	41
113292	324	07/22/2011	12:13:33	29.16	-80.30	42
113293	324	07/22/2011	12:33:37	29.15	-80.30	42
113294	324	07/22/2011	12:49:23	29.15	-80.31	44
113295	298	07/22/2011	13:06:14	29.17	-80.30	44
113296	324	07/22/2011	15:17:09	29.15	-80.23	52
113297	324	07/22/2011	15:26:32	29.15	-80.23	52
113298	324	07/22/2011	15:36:18	29.16	-80.23	51
113299	324	07/22/2011	15:46:17	29.16	-80.23	52
113300	324	07/22/2011	15:58:00	29.17	-80.24	52
113301	324	07/22/2011	16:10:04	29.17	-80.24	52
113302	298	07/22/2011	16:32:32	29.15	-80.22	60
113303	324	07/23/2011	21:14:18	29.66	-80.25	85
113304	324	07/23/2011	21:22:51	29.66	-80.26	70
113305	324	07/23/2011	21:28:44	29.66	-80.26	67
113306	324	07/23/2011	21:39:54	29.67	-80.28	62
113307	298	07/23/2011	22:01:41	29.67	-80.24	94
113308	324	07/23/2011	11:51:48	29.85	-80.29	53
113309	324	07/23/2011	12:00:07	29.85	-80.29	53
113310	324	07/23/2011	12:08:54	29.86	-80.29	53
113311	324	07/23/2011	12:17:42	29.86	-80.29	53
113312	324	07/23/2011	12:24:36	29.87	-80.29	51
113313	324	07/23/2011	12:33:04	29.87	-80.29	52
113314	298	07/23/2011	12:57:26	29.86	-80.28	62
113315	324	07/23/2011	14:59:02	29.92	-80.29	56
113316	324	07/23/2011	15:12:59	29.93	-80.28	54
113317	324	07/23/2011	15:25:14	29.93	-80.29	55
113318	324	07/23/2011	15:34:50	29.94	-80.28	54
113319	324	07/23/2011	15:41:36	29.94	-80.30	52
113320	324	07/23/2011	15:52:57	29.95	-80.28	57
113321	298	07/23/2011	16:10:16	29.93	-80.28	65
113322	324	07/24/2011	18:36:43	29.97	-80.29	56
113323	324	07/24/2011	18:43:59	29.97	-80.28	57

Collection Number	Gear	Date	Time (UTC)	Latitude	Longitude	Depth (m)
113324	324	07/24/2011	18:51:32	29.98	-80.28	57
113325	324	07/24/2011	19:00:01	29.99	-80.28	57
113326	324	07/24/2011	19:12:59	29.99	-80.28	55
113327	324	07/24/2011	19:24:41	29.99	-80.29	57
113328	298	07/24/2011	19:40:54	29.97	-80.28	66
113329	324	07/24/2011	11:55:38	30.00	-80.28	58
113330	324	07/24/2011	12:03:09	30.00	-80.28	54
113331	324	07/24/2011	12:15:00	30.01	-80.28	54
113332	324	07/24/2011	12:25:14	30.02	-80.28	54
113333	324	07/24/2011	12:34:20	30.02	-80.28	56
113334	324	07/24/2011	12:49:04	30.03	-80.28	54
113335	298	07/24/2011	13:12:10	30.00	-80.28	55
113336	324	07/24/2011	15:50:32	30.03	-80.28	53
113337	324	07/24/2011	16:01:06	30.04	-80.28	53
113338	324	07/24/2011	16:10:36	30.05	-80.28	55
113339	324	07/24/2011	16:18:36	30.05	-80.28	56
113340	324	07/24/2011	16:26:55	30.05	-80.28	54
113341	324	07/24/2011	16:37:12	30.06	-80.28	54
113342	298	07/24/2011	17:08:05	30.04	-80.27	68
113343	324	07/25/2011	14:44:51	29.70	-80.46	33
113344	324	07/25/2011	14:55:03	29.70	-80.48	34
113345	324	07/25/2011	15:20:12	29.70	-80.47	34
113346	298	07/25/2011	15:37:47	29.70	-80.46	33
113347	014	07/25/2011	16:00:00	29.70	-80.50	
113348	324	07/25/2011	17:40:28	29.73	-80.45	35
113349	324	07/25/2011	17:47:58	29.73	-80.45	35
113350	324	07/25/2011	17:56:01	29.74	-80.45	34
113351	324	07/26/2011	12:10:26	30.53	-80.46	38
113352	324	07/26/2011	12:24:04	30.52	-80.46	37
113353	324	07/26/2011	12:27:42	30.52	-80.46	36
113354	324	07/26/2011	12:31:45	30.52	-80.47	38
113355	324	07/26/2011	12:37:21	30.52	-80.48	38
113356	324	07/26/2011	12:49:41	30.51	-80.48	38
113357	298	07/26/2011	13:12:07	30.53	-80.45	39
113358	324	07/26/2011	17:56:48	30.91	-80.62	34
113359	324	07/26/2011	18:03:57	30.91	-80.61	35
113360	324	07/26/2011	18:12:01	30.91	-80.61	35
113361	324	07/26/2011	18:23:04	30.91	-80.59	35
113362	324	07/26/2011	18:33:00	30.91	-80.60	36
113363	324	07/26/2011	18:46:48	30.90	-80.60	35
113364	298	07/26/2011	19:11:39	30.91	-80.62	36

Collection Number	Gear	Date	Time (UTC)	Latitude	Longitude	Depth (m)
113365	324	07/27/2011	20:55:32	30.89	-80.61	35
113366	324	07/27/2011	21:03:54	30.89	-80.62	34
113367	324	07/27/2011	11:53:50	31.44	-80.34	36
113368	324	07/27/2011	11:57:37	31.44	-80.35	36
113369	324	07/27/2011	12:11:36	31.44	-80.35	37
113370	324	07/27/2011	12:28:29	31.44	-80.36	36
113371	324	07/27/2011	12:35:24	31.44	-80.35	36
113372	324	07/27/2011	12:40:47	31.43	-80.34	38
113373	298	07/27/2011	12:54:09	31.44	-80.34	37
113374	324	07/27/2011	15:22:08	31.44	-80.33	38
113375	324	07/27/2011	15:30:07	31.43	-80.33	38
113376	324	07/27/2011	15:42:49	31.43	-80.35	36
113377	324	07/27/2011	15:48:32	31.43	-80.36	36
113378	324	07/27/2011	15:52:38	31.42	-80.37	36
113379	324	07/27/2011	15:58:08	31.42	-80.38	35
113380	324	07/27/2011	19:56:42	31.27	-80.42	38
113381	324	07/27/2011	20:13:22	31.26	-80.42	38
113382	324	07/27/2011	20:25:02	31.26	-80.42	38
113383	324	07/27/2011	20:36:12	31.26	-80.42	38
113384	298	07/27/2011	20:55:59	31.27	-80.42	38
113385	324	07/28/2011	12:05:56	31.51	-79.72	72
113386	324	07/28/2011	12:13:04	31.51	-79.72	70
113387	324	07/28/2011	12:17:10	31.50	-79.72	70
113388	324	07/28/2011	12:22:21	31.50	-79.72	69
113389	324	07/28/2011	12:33:47	31.49	-79.72	71
113390	324	07/28/2011	12:34:44	31.49	-79.72	72
113391	298	07/28/2011	12:58:17	31.51	-79.71	72
113392	014	07/28/2011	07:00:00	31.51	-79.72	70
113393	324	07/28/2011	15:02:57	31.49	-79.73	69
113394	324	07/28/2011	15:07:58	31.48	-79.73	71
113395	324	07/28/2011	15:19:14	31.49	-79.74	68
113396	324	07/28/2011	15:46:58	31.48	-79.76	62
113397	324	07/28/2011	16:03:47	31.48	-79.76	66
113398	298	07/28/2011	17:38:03	31.48	-79.76	66



Figure 1. Chevron trap with video cameras attached over the nose and mouth positions.



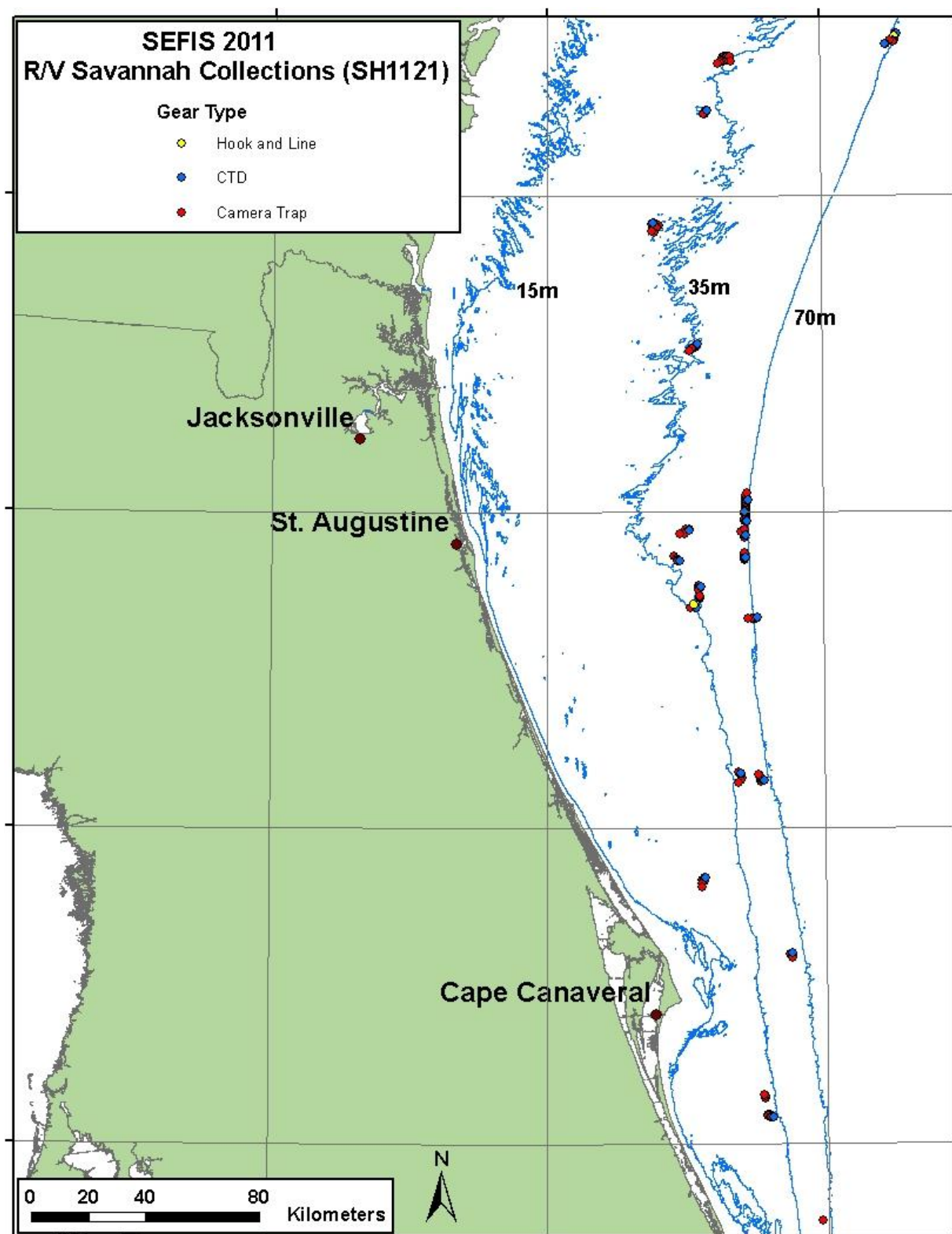


Figure 2. Locations of stations sampled with camera-trap, hook and line, and CTD gear on the SH-11-21 survey. Note that symbols overlap in many cases.

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